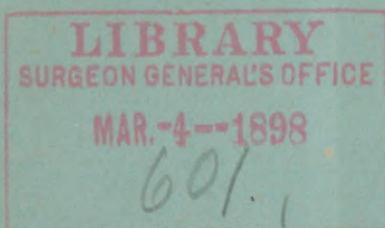


Menger (R.)

THE NEW PARASITIC MITE "ACARUS INCAP-
SULATOR," or "SARCOPTES TRICHO-
GENETOS" (Boeking).

A MICROSCOPIC STUDY AND REPLY.

RUDOLPH MENDER, M.D.,
SAN ANTONIO, TEXAS.



Opuntia agave

The New Parasitic Mite "Acarus Incapsulator," or "Sarcoptes Tricho-Genetos" (Boeking)—A Microscopic Study and Reply.

SAN ANTONIO, TEXAS, September 25, 1896.

To the Editors of the Texas Medical News:

The letter of Dr. Reynolds in the TEXAS MEDICAL NEWS, September issue, needs an explanation, which I hereby give, with your permission, in justice to myself and friends. In the first place, the assertion stated by Dr. Reynolds, that I had published statements in the TEXAS MEDICAL NEWS "that Dr. Fleming says he (Fleming) never wrote," is absolutely incorrect. Fortunately I have all the communications of Fleming and Reynolds on file before me, and every word or sentence that I did mention, as far as Dr. Fleming's statements are concerned, is a true copy of his letters and from an article he had prepared for publication, and which was to be read before the State Medical Association. I just now received a letter from Dr. Fleming, anent Dr. Reynolds' letter to the NEWS, stating that my reports from his documents were entirely correct, and that he never denied it to any one. The facts are, Dr. Fleming and Prof. Boeking and myself gave our opinions frankly to the public, according to such facts as we were able to obtain, and, that Reynolds had sent scrapings and other material taken from his body, containing foreign bodies, for me to examine for him microscopically, was not my fault. But this fact remains, that, besides some unavoidable foreign material the products contained, on examination, after proper preparation and mounting, a number of cuticular remnants and deeper seated products, calcarious deposits, remnants of larva-sheds and a species of acari or mites, some of which were intra—and some extra capsular, i. e.: incased in an oblong or globular shell-like calcarious substance, the inner casing being of yellowish brown color and semi-transparent, in which, on showing the slide to Dr. Boeking, we found plainly visible outlines of some larva in the funnel-shaped casing, also in other micros-

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copic mountings remnants of fibrillæ, from all appearance muscular, many of which were in bundles or isolated, and some interwoven into an oblong body. After making these statements public in our reports, Reynolds tenaciously refused and still refuses the profession a fresh supply of material, which latter was and now yet is asked for, in order to either verify or dispute our reports. Dr. Boeking will have an especial paper on this latter subject of the larva encasings and his opinion of the new mite in a short time for publication. And now, let us argue a little more: How can Dr. Reynolds state that my conclusions were made from "very imperfect" and "incorrect misrepresentation of the facts in the case," when it is known that I gave his case the closest and most impartial attention, sending, for my own satisfaction, some of the few slides I had preserved to the Smithsonian Institute, and to Dr. Herff, Dr. Boeking and to Prof. Virchow at Berlin? It is not Reynolds, but myself and Dr. Boeking who took such deep interest in his case, and lately Prof. Allen J. Smith, of Galveston, also; but Reynolds says "in due time he will make a full and correct report." Now, in all frankness, how can Reynolds do this without a close microscopic examination, which, he told me, he was now unable to do on account of his eye-sight and want of a good microscope. What are Reynold's stated "animalcules" composed of histologically? Theories and denunciations may be well enough if properly applied, but erroneous or misrepresented statements will not do in scientific research, and will sooner or later come to light. Until now, I believe I can say concientiously, none of our statements of microscopic research have been contradicted by competent investigators.

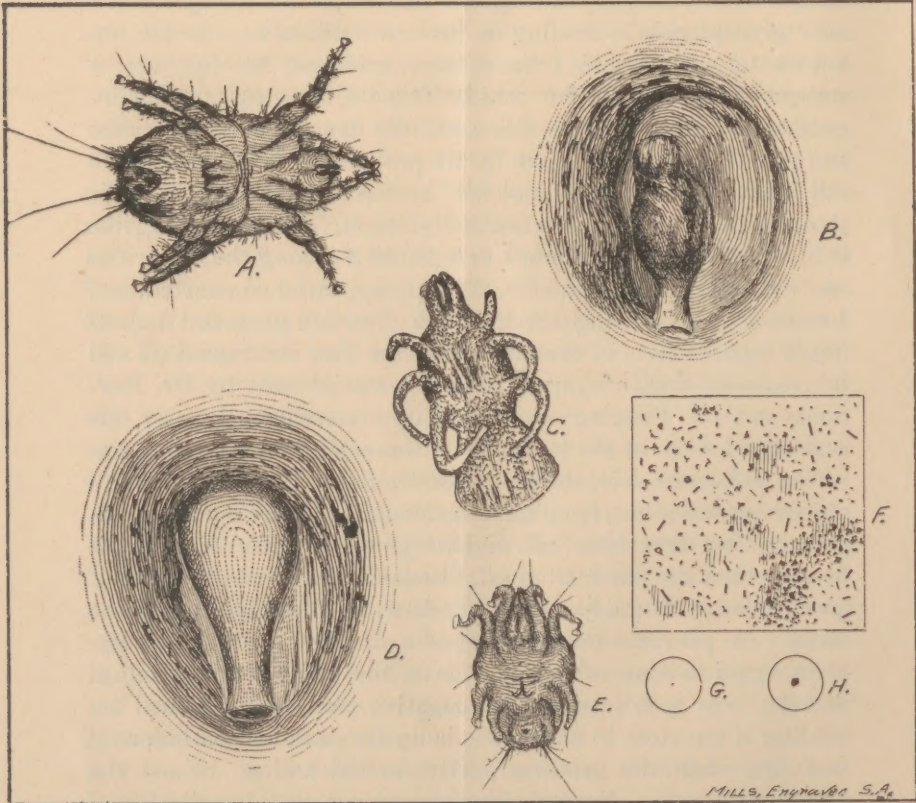
As to the mite found the Smithsonians admitted that they could not say if it was a tyroglyphus siro or not, but they corroborated my statements by saying that they found, besides cuticular remnants, the larva of this same mite. Dr. Reynolds calls his "parasites" "animalculæ," without having made microscopic examinations, as far as I am informed, and these "animalculæ" are undoubtedly the cystic degenerated bodies expelled through his derma, and described already, and which, we have evidence, can be considered as *expelled trichina capsules*, and our sarcoptes to be the real *trichina mite*. Dr. Boeking

will explain this more fully in time, and we are awaiting an answer from Dr. Virchow on the subject. If we are mistaken we will certainly yield to a better opinion, but it must be proven by direct investigation that we are on the wrong track.

At any rate, there are anatomical features in our parasite that denotes it more closely as a species of *sarcoptes* or *sarcophagus*—not “glycophagus”—feeding on proteid substances,—so far unknown to science, and I have other evidence, for instance, a statement of Prof. Allen Smith, Texas University, the distinguished pathologist, who has carefully examined this parasite and who writes to me, that by all probability he is inclined to call it a *sarcoptes species*, and that he has been investigating it thoroughly, but was unable to classify it so far, or find anything like it in our literature. When I first found it among the calcarious and cuticular, etc., remnants, its body appeared contracted, and I succeeded in isolating it on the same objective glass and mounting it separately. It even now had the feet contracted (it will be reminded that, of course, all the material sent by Dr. Reynolds and Dr. Fleming was dried up,—consequently also this acarus and some of the larva, but it was easily macerated in glycerine and acetic acid, showing, besides these, the outlines of all objects perfect); but, from some accidental pressure on the cover-glass, a few days later, all eight legs were spread out, and it became then the much admired, discussed, and abused acarus—now probably in the hands of Virchow, if it safely crossed the ocean. A previous micro-photo of a similar acarus I may explain again to some of my friends of the West Texas Medical Society, was a failure, as the negative was partly ruined by holding it too close to an electric lamp for examination before it was dry, when the gelatina partly melted and so ruined the printing of same. Nevertheless, the acarus just described, and found between remnants of the Reynold scrapings, was a good specimen for micro-photography, and I made several fine copies of same, as seen on the engravings.

I was well aware at the moment I detected some of these acari in the material sent by Drs. Reynolds and Fleming, that they may be nothing but some of the common *sugar* or *sweet mites* (glycophagi) occasionally met with in fruit of all kinds, sugar, flower, etc.; but, on closer investigation and compar-

ison with such mites later, I was perfectly convinced that this mite is a new species. Here is what one authority says of mites in general: "They are to be met with in almost anything that contains sugar, amylum or nitrogen, in organic or unorganic compounds, but there are substances in which so far they do



MILLS, Engraver S. A.

- A. The parasitic mite; legs fully stretched out. (x : ab. 400.)
(The position of the hair or bristles on hind body and the legs is correctly copied, but the fine short hair along the feet and body are superfluous. —else the engraving is a true and fine copy of the original micro-photo.)
- B. Globular cystic body with remnant of larva cast in the interior cystic inclosure. (x : ab. 200.)
- C. Larva of the same acarid. (x : ab. 500.)
- D. Oval or pearshaped cystic body with funnelshaped outlet. (x : ab. 200.)
- E. The parasite with feet contracted. (x : ab. 300.)
- F. General appearance of the raw material sent for examination.
- G. Dot in centre of ring showing the normal size of the parasite.
- H. Largest size of the globular, dark brown opaque bodies.

not occur, and that amongst other things is the case with soft fats and oils (how about R.'s cold cream?), and what is the efficient part in the common louse or itch ointments if not the fat?—because it enters into the trachea and chokes the malefactor, the sulfur, etc., being only an adjuvant to accelerate the process.”

Dr. Reynolds says the Smithsonians called our mite a “*tyroglyphus siro*”—cheesemite. Now, this is not exactly what the experts did say. They said it resembled somewhat the *T. siro*, “*but whether it is the same or not we are unable to say.*” Besides this (after citing some instances in which tyroglyphi were found) they remarked: “Those cases show that tyroglyphi may occasionally produce a disease similar to *sarcoptes scabiei*.” These are candid statements of the Smithsonians and the more highly respected, as I overheard Dr. Boecking state that this branch of the acarinae (tyroglyphi and *sarcoptes*), in some genera, were not as yet satisfactorily studied, and that it was therefore requested (by some Smithsonian expert) to not criticise the matter too severely. In the *American Medico-Surgical Bulletin* of August 22d, 1896, mention is made in “Texas Letter” (citing from a private letter of Dr. Reynolds) of the following: “the only perfect specimen of Dr. Menger was obtained from scrapings which contained a large amount of *cold cream*”—that consequently, that only perfect specimen was a species of cheesemite or other, living in the cold cream, “and not at all the skin-parasite which has caused him so much suffering for the last year”; and in the *TEXAS MEDICAL NEWS*, page 495, Dr. Reynolds says also in his letter: “the Smithsonians were correct in classifying the animalculæ of this photo as a *tyroglyphus siro*—cheesemite,—which were scrapings from a lotion of sweet cream, which in time, by fermentation of the scrapings, produced the cheesemite. The Menger and Boecking report are based upon this cheesemite.”

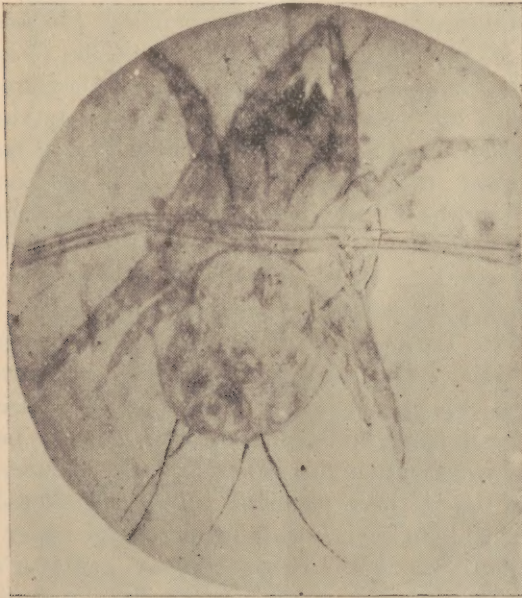
Now, only a few more remarks about this interesting little controversy. Organic substances undergoing the process of fermentation generally show under microscopic investigation a vast number of different types of bacteriæ; remnants of fibrous or cellular material, and all sorts of tissue detritus, etc.,—perhaps, of course, also mites; but these, it has been shown, and I

may be allowed to further explain, do not originate or feed in a lotion of cold cream, for this reason: One of the main ingredients of cold cream is *glycerine*, and this glycerine is the essential sweet principle of oils and fat, and it is rather antagonistic towards fermentation. There were no signs, either macro-nor microscopically, of fermentation of the material examined; it was a dry, dark brown, and sand like or granular material.

If you examine under the microscope the common cheese mite, or the fruitacari, mounted in glycerine, you will notice that those mites which are still alive will be struggling for their existence; there is a lively stretching and bending of the feet joints and body, and rolling around, until, in a very short time after mounting, perhaps only five minutes later, the ferocious movements of the mite gradually ceases,—they are paralyzed and die a few seconds later. This is what I have noticed during late investigations, and it shows that such mites cannot thrive in cold cream. And what our especial parasite is concerned, it is fully grown, a much smaller and more “bolder” appearing acarus, hardly visible to the naked eye, and, as far as I could outline the endparts of the legs, under very high power, and as seen on the engraving, they showed, besides hooks or claws, a stirup-shaped discus or sucking cup—characteristic of the *sarcoptes* species.

In microphotography of course only such objects and outlines can be copied which come under sharp focus of the lenses of the microscope, especially in making a photo of such objects as our mite under a very high magnifying power; for this reason the outlines of the terminal parts of the legs were not so sharply outlined as the rest of the body and legs and had to be outlined somewhat on the negative to make a print; also some of the very thin hair on the foot-joints were not plain enough on the photo-print, but I vouch for the *correct* position of these as the entire parasite in the engraving; the engraver having been instructed to be very careful in all the details, as laid before him by the photos, negative and prints, and direct accurate drawing. And as further evidence of the correctness of our first opinion, I have just received (October 9, 1896) from Professor Smith, of Galveston, a very interesting and exhaustive report on the genus of our acarus. Dr. Smith states that he

used as a guide, Megnin, "*Les Parasites articules*" in working out his ideas. The statements are too lengthy to include them all in this report, and I only mention the following points: "I have been looking up all the data I can get hold of in my endeavor to identify the dermal parasite. There seems to me to be no doubt of the parasite being an acarus. The mode of articulation of its legs, the fact of its having five divisions to each limb, its chloliform or pincers like jaws in my mind place it surely among the sarcoptides. (Here follows an exhaustive



(Micro-photo by R. M., July, 1896.)

The same mite as before, magnified about 800 times, (considering the minuteness of the parasite, this may be considered a fine piece of micro-photography of the original; time of exposure: 12 min.; extra lensappliances.)

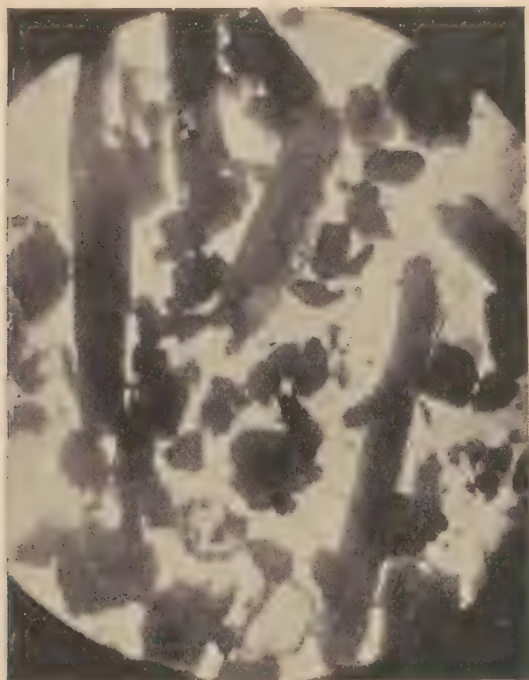
explanation on the five tribes of the sarcoptes family) . . . " ("It differs in being provided with a somewhat . . . integument, in having unequal limbs and, I believe dissimilar in having a distinct cleft in the abdominal extremity. Then, too, if it were not for the doctor's statement to me by letter that the parasite was in some cold cream there would be no reason for seriously

thinking of it, as these sarcoptes detriticoles (to which belongs the tyroglyphus) live on dead decaying animal and vegetable matter and are not parasitic). "It is not to be mixed up with the bird infesting sarcoptes (*S. plumicoles*)—the latter has all its legs well developed, and never even tending to be abortive (as in the last pair of the R's parasite) and never produce painful or itching sensations; (by some poison in its bite) . . . " I would place R's parasite, from its shape, its somewhat striated or . . . coat, its undeveloped hind pair of legs, and its power to produce itching, among the true itch sarcoptides . . . " "I believe the R. parasite to correspond with the genus of *chorioptes*. As to species, I am still uncertain, but believe it to be *C. ecandatus*, . . . " I see no hairs on the third pair of legs (they are present on this parasite, but were unclear or not visible on the micro-photo. R. M.) and only two clearly on the abdominal border. I can not make out the dorsal plate, etc., since the photograph from which I must take my points, only gives the ventral surface . . . etc. "Aside from these the description suits well, and if these differences are real I believe that at least the genus is correctly fixed, and the species perhaps a new one."

On page 496, TEXAS MEDICAL NEWS, Reynolds says, "after having seen his imperfect manner of mounting and micro-photos, and imperfect report and misrepresentations, I refused" . . . etc. Now, I will leave this to anyone who wants to believe it! I have a good conscience in this entire Reynolds' matter,—being well aware of the intrinsic problems often encountered in such investigations and having handled the microscope under German authorities many years in Leipzig, Saxony, and ever since my graduation thesis in 1874 on an important microscopic study. And, as to *micro-photography*, I will only state that for the last fifteen years I have off and on worked in this line, and have accumulated perhaps one of the largest private collections of microscopic photos on select objects in Texas, and I remind the profession of the work I had done many years ago for Dr. McLaughlin in aiding him in this line when he detected the dengue fever micrococcus, in samples of blood from dengue fever patients in the blood cells and serum prepared under strict precautionary and bacteriological measures, which, I may add, took a great deal of practical experience on my part and scientific

experimentation, on account of the less powerful microscopic lenses I then used, but, nevertheless, achieved excellent results in reproducing the bacteria. (This sphaereo-bacterium was about fifteen times smaller than a blood corpuscle.)

It is now evident, from further evidence, that the disease in R.'s case is seated deeper than the skin and sub-aponeurotic layers:—*in the muscular spaces*, the skin being the most resist-



(Micro-photo by R. M., July, 1896.)

Some of the raw material of Reynold's disease, mounted in glycerine (without applying an acid) showing oval (demon-shaped) and globular bodies. Small power. ing integument for the expellation of the foreign bodies. And, that the R. case is a very unique one per se and in medical literature has been already shown in a former article in the TEXAS MEDICAL NEWS, vol. 5, page 337, and there are absolute proofs that it is not a fake or a myth. Dr. Fleming told me that at one time he had the patient standing upon a large piece

of newspaper and that, after applying vinegar to the upper extremities and sweeping his hand over them, quite a quantity of the sand-like material fell down upon the paper below. Dr. Reynolds himself wrote to me also, in one of his many letters, that he was most of the time afflicted at night-time, and that in the morning often his bed-sheets were covered with the peculiar material, having barely had rest at night. And Dr. Boeking recalled to me an authentical case, somewhat similar to Reynolds', in that that calcarious bodies were situated in this instance near to the cutis of the backpart of the neck. This happened in Germany some thirty-five years ago, said Boeking, when a patient, suffering from a tumor or some phlegmonous inflammation in his neck, was admitted into Langenbeck's Klinik at Berlin. Langenbeck's scalpel, on cutting through the tissues, came in contact with some calcarious substance, and this, on examination, proved to be trichinae capsules, and the fact was also established by three other witnesses, that many years ago this same patient, with two others, had partaken of trichinotic pork and had contracted trichinosis, but recovered, whilst the other two died of it. Reynolds' case is the more extraordinarily interesting in that it seems to be the only case on record where, from all appearances, trichinae capsules and the transformed trichinamite, named by Dr. Boeking as "*sarcoptes tricho-gene-nicos*," are expelled through the derma in larger areas of the body. Dr. Fleming told me lately, on a visit to San Antonio, that formerly the sand-like material escaped more from the upper extremities, even the face, but that lately the disease seems to have a tendency to gravitate downwards, from the upper abdominal region to the thighs and lower extremities (from local symptoms manifested). This gravitating process towards the skin, Boeking thinks, has much to do in rounding the cystic bodies before being expelled. Some of these globular bodies (as seen in the illustrations, and drawn by an expert engraver from some of my micro-photos). I may call attention again, and as explained in the TEXAS MEDICAL NEWS, vol. 5, page 342, were made transparant by the action of dilute nitric or acetic acid, which dissolved more or less the outer calcarious matter and showed the inside globular, semi-transparent and vetrinous-like

cystus with a delicate funnelshaped outlet on the surface; in some instances still showing remnants of a larva or puppaeast.

In a letter just received from Prof. Reynolds, he writes that he had removed any amount of sandlike scrapings, and that he had somewhat reduced the sandbeds that have formed in various parts of the skin, as on hips, sides and outer parts of thighs. This, if we consult authorities (*Leuckart*, *Geheimer-Medicinal-*



(Micro-photo by R. M., July, 1896.)

Some of the globular bodies; the smaller one in middle incasing remnant of karvashed or puppa, with funnel-shaped outlet below the globular cystus.

rath und Director des Zoologischen Instituts, Leipzig, Saxony: "*Untersuchungen uber Trichina spiralis*,") cases are mentioned, (although rare in this region) where the trichinae were deposited near the cutis in the glutaecal regions and near the thighs, and, I doubt not, there have occurred perhaps many similar cases of trichinosis where the real cause was overlooked and treated for

some rheumatic trouble. As regards early history of trichinæ, it is mentioned in Leuckart's work that the flesh, in which Owen first had detected the parasitic worm, came from the corps of an Italian, who had died of Bright's disease and lung tuberculosis in the Londoner St. Bartholomew Hospital, where the Hilton cysts had become known in the mean time. The capsules were at that time detected by the student Paget. They were so hard that ultimately the dissecting knives got dull on them, etc."

"There are but few discoveries in the realm of Helminthology, which, amongst professionals, especially anatomists and physicians, had made such enormous sensation, than the discovery of our trichinæ, inasmuch as we had to deal not alone with an entirely unknown human parasite, but even more so with the fact, that this parasite invaded the human system up to the number of millions." . . . "But, not alone English investigators were familiar with this parasite." In the year 1835 Henle,—then prosecutor in Berlin, could add to Owens' discoveries, that he had detected trichinæ capsules already in the winter of 1834-'35, but had judged them then as mere *calcareous congregations*, which, later he recognized as *encasing worms*."

. . . "Vogel (Pathol. Anat., 1845) considered the cyst to be a *Cocoon*, and Luschka, believed the cyst to be an embryonical—or *eggshell* (the inner-incasing.) . . . "Farrie and other former observers also spoke of an *outer* and *inner* cyst,

. . . but the outer capsule Farrie's is a very delicate connective tissue surrounding, in the interior of which the oval or lemonshaped calcified capsule is situated, etc."

Before concluding this matter, the following explanatory views of Dr. Boecking, regarding the causal nexus between our mite and trichina spiralis, intended for publication in the *News* is hereby submitted to the careful perusal of the profession:

"Dr. Menger, at the time of his first investigations, was kind enough to visit me for a consultation, and brought along with him the several original slides mounted by himself, together with his own microscope and a number of micro-photographs illustrative of the morbid products. In looking at the motley congeries of objects I discerned, besides unidentified material, that the major part of it was undoubtedly inorganic in substance if not in origin, and apparently of a pathological nature:

Lime detritus in two aspects: one a recently emerged white paste, flown out in a liquid state and subsequently hardened, forming irregular white plates with their edges slightly rounded off by mechanical rubbing, and possibly caused by the remedies applied to the patient; and secondly, an older granulated lime *breccia*, baked together in irregular lumps by infiltration of serum, fat and hæmatin. This latter formed about 75



(Micro-photo by R. M., September, 1896.)

Muscular trichina, encapsulated, and one stray trichina spiralis, not yet encysted. (From microscopic slide, by Wm. Barbeck, San Antonio.)

[Above is included for comparison with the Reynolds' products.]

per cent. of the whole mass, and was of all shades, from a light yellow to the darkest brown. Interspersed with this miniature hardpan were numbers of organic vestiges, dermal abrasions and cast-offs, capilli, different bacilli, siliceous monocellular algæ and shed skins of mites, all more or less either splashed with lime, or partly imbedded into the granular conglomerate.

But the most remarkable feature was the occurrence of *dead acarina*, more or less travel-worn, but encysted in the mass and apparently in their natural situs. Likewise there were larva-casts of this acarus, adhering yet to the inside of the oval moulds, after the living occupant, *by natural process*, had left his habitation. This being a case altogether new to me, never having seen mites to encase themselves during whatever phase of their development, this feature focussed my whole attention, and set me to searching for a plausible causal nexus between an arachnidian and a lime cystus as neatly adapted to its contours as precluded *prima facie* accidental shaping. There was a certain familiar look about those egg pellets, but I failed for some time to locate them, and became lost in speculation. Where did that lime come from? The mite could not have secreted it. Perhaps the body of the host furnished the material as well as the shape? But I was forced to abandon one conjecture after the other, till in despair I went further a field into neighboring territory. The crustaceans yielded as little consolation as the aquatic arachnoids; the annelids furnished plaster-workers plenty and to spare, true enough, but what had a *serpala* or a *cestoda* in common with a mite, beyond its evolutionary connexus? Gegenbaur had no balm for me, and Lacaze-Duthiers no text, until in turning the leaves of the last volume of Brehms "*Thierleben*" my eye caught the word *trichina*, and the scales began to fall off of me. Those oval lime larva cases tallied with the trichina's and in the same time must be the puporia of the acarus. Size, material, position in the host, and best of all, the whole symptomatology of the case removed it from the field of cutaneous affections proper, and stamped it as a disease the focus of which lay deeper than the cuticle. It was a case of true muscular trichinosis without a doubt, and the acarus, if not a robber, who had ousted the legitimate occupant, must needs be the culminating phase of *trichina spiralis* itself; there was no getting around that fact, no other alternative being possible. A further going into the case convinced me, that the mite did not come from the outside, but generated inside the cutis, also that it was not a double parasite, as larva cases with only one single outlet and that opened from the inside, can be discovered, and as the mite fits too snugly and accurately into the house as to be able

to turn about in it. Moreover, there are no traces of an old-fashioned trichina to be found, such as are familiar to us coiled up, like the semi-lunar fold in the human eye, in its berth when looked at in a less progressed and previous stadium. To lose no further words, the trichina of Richard Owen had ceased to be, and the "*cystiglyphus trichogenetos*" appears in its stead.

The *trichina mite*, of which Dr. Menger shelled a splendidly preserved specimen out of its case, and which had passed the pores of the cutis unharmed, turns out by its morphology to belong to the proteid-feeding group: I have so far not been able to identify it with any known species, and as it presents features distinctly its own, I have provisionally named it as above, leaving the final nomenclature and systematic to later inquiry.

As to the seeming vehemence, of letting an acarus come directly from an annelide, I will recall here only the *hair follicle mite*, where we have the two joined in one and the same individual with the cephalothorax of the former and abdomen of the latter. And besides, as the late Geoffroy Saint Hilaire used to say, "*Je ne saurais faire que ce qui est ne soits pas!*" Facts are facts, and the multiplication of them must logically be followed by a change of theories.

As the reader will see, the conclusions above come to are, besides upon the reports of two trustworthy medical men, entirely based on my part upon microscopical observation alone. To test their validity I suggest that the patient be persuaded to submit to inspection by the Roentgen rays, to settle the trichinosis question, and that the germs Dr. Fleming speaks of be inoculated, technically, into all the animals, mammals as well as birds, which are known to be amenable to the malady. If this test succeeds, then the matter may be considered as finally settled; if it fails, then the result of this investigation will only add one more plague to the others already extant, and my *cystiglyphus* must stand on its own legs. *But from whichever side we may look at the matter*, the case is *unique* and ought to be profited by as long as it lasts. We might eventually have to wait another thirty years before a like chance occurs.

A. E. BOECKING, Ph. D.

SAN ANTONIO, TEXAS, October 16, 1896.

I now add here some more data, most of which was contained in my article in the *News* in June (Vol. V, No. 8) so that the readers may better understand the matter and make their own conclusions. In an especial letter of inquiry (April 6th, 1896) concerning the *symptomatology*, Dr. Fleming had kindly favored me with the following data:

“The patient is a man 74 years old. About eight months ago (it will now be about one year and 3 months, and he is still afflicted) he became afflicted with the disease, and has been a great sufferer ever since. The animalcules are all over his body, more particularly on the thighs and arms and between the toes.

“The disease appears with small pimples here and there, from a pale to a fiery red, and at times under treatment will appear apparently well, but on application of ointments or lotions reappear in greater or less and larger and smaller pimples.” “The disease is not attended with itching, but when very red has a slight burning sensation. The animaculi, it seems, on maturing, emerge from the skin, and in some cases seem to discharge germs covering a space more or less dense from a half to two inches in diameter.” “The various remedies I have used have caused many of all sizes to come to the surface, some bore under the skin again, and although I have picked off thousands, I have never seen one move, yet one of the great annoyances to the patient is their crawling on the skin, and biting is much like a flea or a chinch, and often so rapid is it done that a person has to be quick or it will bore in before you can pick it off with the point of a knife.” “The bites and pimples never suppurate nor exude serum, but often from the use of lotions and ointments are difficult to heal, the animalcules remaining and resisting all remedies to a great degree, and whilst many disappear under treatment, others are very annoying and painful, as though feeding on the tissues.”— * * *

“I assure you that every particle of the samples I sent you came from his body,—he never has taken a sand bath; he always washes himself in hot water, as it seems to give him more relief. I have watched him closely for six months and have tried every known remedy with no success. The particles of sand-like material or shells, or whatever it is, all come from him, and

are not put on him by washing or any application. When I use vinegar on him there will come out on his body more sand or shells, and in the morning his body contains more than in the day time, keeping him awake through the night, which annoys him so he rests barely at night. I have scraped regular barnacles formed by the insects at night from between his toes and creases of the arms and elbows," etc.

With the exception that the animalcules were noticed over the entire body even on his head and eyelids, as the professor told me personally when on a visit to San Antonio, the symptoms as here stated would tally with those of the common *itch sarcoptes*, but, as seen, had the patient the usual itch plague, there certainly would have easily been found numerous remnants of the itch parasite and its larvæ, ova, etc., and then the itch disease is easily amenable to anti-parasitic treatment. The parasites found, (either entire or in remnants (incrusted) were dead acarinae, and the eight-legged acarus is some new—at least so far, undefined species of sarcoptes, and the main question presents itself: "Are they consequence or coincidence of the disease?" and, from the pathological products expelled, some of which showed larva or pupa encasings, the latter seems very probable. And, right here, gentlemen, in order to show the profession how little I and my friend Dr. Boecking had failed in giving this matter of Reynolds a thorough investigation, I have *prima facie* evidence from the old gentleman himself! In a letter which accidentally came into my hands a few days ago, and which I copy in the interest of science, Professor Reynolds gives a close observation of his case,—considering the fact that he made these observations without the aid of a microscope (using a solar lense, I suppose). Here is a part of his statements:

"They range (our calcarious cystic bodies) from a very small black speck up to a good-sized mustard seed, of different forms and species . . . of globular, oval, oblong oval, cylindrical, tubal and cono-spiral form." . . . "few escape my feel." "When they emerge they are all dark colored, and change by exposure." . . . "I have often taken numerous of the small black young out of the apparent sack (our "cystus") of the female animalculi, and the vinegar may have extracted the calcarious matter and made it friable." (This com-

compares with my statements of the calcareous bodies treated, before mounting, with dilute nitric or acetic acid!) "I have extracted and separated many into two or three to a dozen small animalcular shells of regular form, generally globular." (This also corresponds with my first report, where the dark brown, black or red-colored calcareous formations were conglomerated and apparently infiltrated with tissue detritus and hamatin extracts (brown, black and red)."

The general histology of our globular or oval bodies undoubtedly correspond with that of the cystus in *trichina spiralis* in its calcified state. I have found and shown by photo illustrations the near relation in form, size and color of these bodies, and that the globular or lemon form predominates. Through the mechanical rotating process of these calcareous parasitic bodies in being brought from the deeper muscular layers until expelled through the derma of the patient, the surrounding tissues of the cystus is naturally converted into a more solid and more globular formation.

Still later (October 30th, 1895), Professor Reynolds writes me, in a friendly letter, that he has so recovered "as to be tottering around, but cannot walk so erect and straight, and trembles, as when visiting San Antonio. "The disease still stubbornly resists all treatment—sometimes a little better, and then [again] worse. "Had you been here yesterday, while anounting and scraping, you could have taken off animalcules, etc., to your heart's content, of different order and genere and species of molusks, radiates, and cryptogami, and any amount of fine sand like scrapings. Professor, of St. Louis, whom I send samples, reported abundance of sand and vegetable-matter (cryptogami) and short hairs, etc." . . . Now, without wishing to criticise the later statements, I will repeat again what the direct result of my microscopic examinations were (I make these statements entirely independent of Dr. Boecking's). In the first place, R.'s subcutaneous detritus, (foreign substances proper,) expelled through the derma, was no *sand*, although it had the general *macroscopic* appearance of same. If sand be examined, clean dry sand, or such taken from the bottom of the sea mounted in glycerine, one mass of crystalline, glass-like material, will be noticed; in the latter also infusoria and diatomes and

vegetable remnants (trip to Rockport, September, 1896), but this sand, nor the dry clean sand, contains any carbonate of lime at least only in very minimal quantities, and therefore does not effervesce on applying an acid. In applying an acid to the R.'s material though, the larger bulk of it, and in particular also the oval or lemonshaped incrustations will at once commence to develop carbonic acid gas on applying the acid, and many of them crumble up into an amorphous brown powder, in some instances exposing a globular or oval hyaline cystic body. Besides, these calcarious and silicious transformed bodies, lime deposits, etc., the specimens contained numerous *bacilli* or rods (short and partially curved, band-like, transparent and highly refractive (silicious?) fibres of beautiful red or blue color); also capilli, but very sparingly; also cuticular abrasions and shed skins and remnants of pupparia.

Dr. A. E. Boeking, now in Fredricksburg, Texas, who, as stated in my previous article in the *Texas Medical News*, is an expert in medico-zoological questions, stated to me in a previous communication, in commenting on the parasitic mite, that there is more important material, biological as well as medical, under the surface of this seemingly trivial question, whether our acarus be a *glycopagus* or a *sarcophaga*, than appears to one not initiated in this especial case, and as it is the purpose of this paper to communicate all possible data in connection with it, I will state the main points of Boeking's letter, which, in connection with a number of micro-photos, and the mite itself, I had forwarded to Professor Virchow, at Berlin. Boeking said:

"As soon as I had ascertained the connection of the lime cystus with the acarus, by finding the six-legged larva of it in its inside, the question for me was solved—that the mite was a *novum*, no parallel hitherto being known to science of mites encasing themselves. In further investigating, I found that the cystus is not formed by the mite, but by the old host, because the calcification did not stop after maturity of the larva into the perfect acarus, but went on filling out the empty capsule, or else enveloping the left skin. For the students of parasites the parallelism with the muscle trichina lies too near not to obtrude itself, and the natural question arises: Is there any possible causalnexus between the two? Formerly, such a question would

have been relegated to limbo, but in our evolution age the question is altogether legitimate. After Virchow's monograph, it has tacitly been assumed, that the parasite (intrichinosis) is the housebuilder, but the direct question seems never to have obviated itself to anybody. In the case of trichina, there certainly stands not the difficulty in the way which in the case of acarus is obvious."

In conclusion, I beg to remark that the above statements, especially those from correspondence, were necessarily included herein in order to give a clear view of this matter, submitted to me for investigation, and I have no other motive but the deep interest taken in this case of Reynolds' in publishing the results. If mistaken, or otherwise informed by better authorities, I will be only too glad to take the consequences. We have here to deal, from all stated direct evidences, with a chronic and very unusual disease, over 16 months standing—entirely uncontagious; and, so exceedingly interesting this case will prove, if substantiated,—(which I have no doubt about),—that it revolutionizes all heretofore known experience regarding trichinosis, namely: in the production, through different stages of metamorphosis, a *mite* out of a worm—Boecking's *trichina mite*, and the final disposal of the trichina capsules and other remnants through the cuticle of the patient.

Very respectfully submitted,

RUDOLPH MENDER, M. D.

SAN ANTONIO, TEXAS, October, 1896.

